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The scientific evolution of the Ommaya reservoir: a bibliometric analysis

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Abstract

Background: Since its introduction in 1963, the Ommaya reservoir has expanded beyond its original role as a ventricular access device to support intrathecal therapeutics, cerebrospinal fluid diagnostics, and emerging applications in precision neuro-oncology. To our knowledge, the evolution of this research landscape has not been quantitatively characterized.

Methods: We analyzed Web of Science Core Collection publications on June 19, 2026, retrieving 896 articles, of which 862 were included (English, unique DOI, complete metadata). Bibliometric analyses included publication trends, author impact, international collaboration mapping, keyword co-occurrence networks with spectral clustering, temporal overlay visualization, and abstract n-gram analysis. Analyses were performed in MATLAB v2025a.

Results: Output increased from 1 to 3 articles annually in the 1960-1970 s to a peak of 67 in 2024, with nearly 90% of publications appearing within the past two decades. The United States contributed 323 publications (37.5%) and was the central collaboration hub. Four dominant themes emerged: neuro-oncology and intrathecal therapeutics, hydrocephalus and device-related complications, craniopharyngioma management, and surgical techniques with drug delivery. N-gram analysis revealed rapid emergence of "liquid biopsy" and "immunotherapy" in recent abstracts. Temporal analyses demonstrated a progressive shift in research from ventricular drug delivery toward cerebrospinal fluid biomarkers, molecular diagnostics, immunotherapy, and targeted therapeutics.

Conclusions: Ommaya reservoir research has evolved from ventricular access and intrathecal drug delivery toward molecular diagnostics and precision neuro-oncology. Rather than reflecting device changes, these trends illustrate the expanding role of cerebrospinal fluid as both a therapeutic and diagnostic compartment in modern neuro-oncology.

Keywords: Bibliometric analysis; Hydrocephalus; Intrathecal chemotherapy; Keyword co-occurrence network; Leptomeningeal disease; Ommaya reservoir.

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